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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Mladen Barbic	Examiner:	To be assigned
Serial No.:	10/849,764	Group Art Unit:	2878
Filed:	May 20, 2004	Docket:	G&C 176.19-US-U1
Title:	TWO-DIMENSIONAL MAGNETIC RESONANCE TOMOGRAPHIC MICROSCOPY		

CERTIFICATE OF MAILING OR TRANSMISSION UNDER 37 CFR 1.8

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on December 15, 2004.

By: _____
Name: Jason S. Feldmar

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

We are transmitting herewith the attached:

☒ Transmittal sheet, in duplicate, containing a Certificate of Mailing under 37 CFR 1.8.
☒ Information Disclosure Statement and Form PTO-1449.
☒ Cited Reference(s).
☒ Return postcard.

Please consider this a PETITION FOR EXTENSION OF TIME for a sufficient number of months to enter these papers, if appropriate.

Please charge all fees to Deposit Account No. 50-0494 of Gates & Cooper LLP. A duplicate of this paper is enclosed.

Customer Number 22462

GATES & COOPER LLP
Howard Hughes Center
6701 Center Drive West, Suite 1050
Los Angeles, CA 90045
(310) 641-8797

By: _____
Name: Jason S. Feldmar
Reg. No.: 39,187
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(PTO TRANSMITTAL - GENERAL)

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INFORMATION DISCLOSURE STATEMENT(37 C.F.R. §1.97(b))

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

With regard to the above-identified application, the items of information listed on the enclosed Form 1449 are brought to the attention of the Examiner.

This statement should be considered because it is submitted before the mailing date of a first Office Action on-the-merits. Accordingly, no fee is due for consideration of the items listed on the enclosed Form 1449.

In accordance with 37 C.F.R. §1.98(a)(2), a copy of each foreign patent document and each non-patent document listed on the enclosed Form 1449 is provided.

No representation is made that a reference is "prior art" within the meaning of 35 U.S.C. §§ 102 and 103 and Applicants reserve the right, pursuant to 37 C.F.R. § 1.131 or otherwise, to

establish that the reference(s) are not "prior art". Moreover, Applicants do not represent that a reference has been thoroughly reviewed or that any relevance of any portion of a reference is intended.

Consideration of the items listed is respectfully requested. Pursuant to the provisions of M.P.E.P. 609, it is requested that the Examiner return a copy of the attached Form 1449, marked as being considered and initialed by the Examiner, to the undersigned with the next official communication.

Please direct any response or inquiry to the below-signed attorney at (310) 641-8797.

Respectfully submitted,

GATES & COOPER LLP
Attorneys for Applicant(s)

Howard Hughes Center
6701 Center Drive West, Suite 1050
Los Angeles, California 90045
(310) 641-8797

Date: December 15, 2004

By: _____
Jason S. Feldmar
Reg. No.: 39,187

JSF/amb

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IN AN APPLICATION	Filing Date: May 20, 2004	Group Art Unit: 2878

U.S. PATENT DOCUMENTS						
EXAMINER INITIAL	DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

FOREIGN PATENTS							
	DOCUMENT NO.	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
						YES	NO

NON-PATENT DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)		
		[3] P. C. Lauterbur, IMAGE FORMATION BY INDUCED LOCAL INTERACTIONS: EXAMPLES EMPLOYING NUCLEAR MAGNETIC RESONANCE, Nature (London) 242-243, 190 (1973).
		[4] P. Mansfield et al., NMR 'DIFFRACTION' IN SOLIDS?, J. Phys. C 6, L422-l426, (1973).
		[8] J. Aguayo et al., NUCLEAR MAGNETIC RESONANCE IMAGING OF A SINGLE CELL, Nature (London) 322, 190-191, (1986).
		[9] S. C. Lee *et al.*, COMMUNICATIONS: ONE MICROMETER RESOLUTION NMR MICROSCOPY, J. Magn. Reson. 150, 207-213, (2001).
		[12] P. Mansfield et al., "DIFFRACTION" AND MICROSCOPY IN SOLIDS AND LIQUIDS BY NMR, Phys. Rev. B 12, 3618-3634 (1975).
		[13] J. A. Sidles, NONINDUCTIVE DETECTION OF SINGLE-PROTON MAGNETIC RESONANCE, Appl. Phys. Lett. 58, 2854-2856, (1991).
		[14] J. A. Sidles et al., MAGNETIC RESONANCE FORCE MICROSOCPY, Rev. Mod. Phys. 67, 249-265 (1995).
		[15] D. Rugar et al. MECHANICAL DETECTION OF MAGNETIC RESONANCE, Nature (London) 360, 563-566 (1992).
		[16] D. Rugar et al., FORCE DETECTION OF NUCLEAR MAGNETIC RESONANCE, Science 264, 1560-1563, (1994).

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		[17] Z. Zhang et al. OBSERVATION OF FERROMAGNETIC RESONANCE IN A MICROSCOPIC SAMPLE USING MAGNETIC RESONANCE FORCE MICROSCOPY, Appl. Phys. Lett. 68, 3-pgs., 2005-2007, (1996).
		[18] K. Wago et al., LOW-TEMPERATURE MAGNETIC RESONANCE FORCE DETECTION, J. Vac. Sci. Technol. B 14, 1197-1201, (1996).
		[19] K. J. Bruland et al., FORCE-DETECTED MAGNETIC RESONANCE IN A FIELD GRADIENT OF 250 000 TESLA PER METER, Appl. Phys. Lett. 73(21), 3159-3161, (1998).
		[20] B. C. Stipe et al. MAGNETIC DISSIPATION AND FLUCTUATIONS IN INDIVIDUAL NANOMAGNETS MEASURED BY ULTRASENSITIVE CANTILEVER MAGNETOMETRY, Phys. Rev. Lett. 86, 2874-2877, (2001).
		[21] T. D. Stowe et al., ATTONEWTON FORCE DETECTION USING ULTRATHIN SILICON CANTILEVERS, Appl. Phys. Lett. 71, 288-290, (1997).
		[22] O. Zuger et al., FIRST IMAGES FROM A MAGNETIC RESONANCE FORCE MICROSCOPE Appl. Phys. Lett. 63, 2496-2498, (1993).
		[23] O. Zuger et al., THREE-DIMENSIONAL IMAGING WITH A NUCLEAR MAGNETIC RESONANCE FORCE MICROSCOPE, J. Appl. Phys. 79, 1881-1884, (1996).
		[24] M. Barbic, MAGNETIC RESONANCE DIFFRACTION USING THE MAGNETIC FIELD FROM A FERROMAGNETIC SPHERE, J. Appl. Phys. 91, 9987-9994, (2002).
		[25] M. Barbic et al.SAMPLE-DETECTOR COUPLING IN ATOMIC RESOLUTION MAGNETIC RESONANCE DIFFRACTION, J. Appl. Phys. 92, 7345-7354, (2002).
		[27] P. Streckeisen et al., INSTRUMENTAL ASPECTS OF MAGNETIC RESONANCE FORCE MICROSCOPY, Appl. Phys. A: Mater. Sci. Process. A66, S341-S344, (1998).
		[28] C. Petit, SELF-ORGANIZATION OF MAGNETIC NANOSIZED COBALT PARTICLES**, Adv. Mater. (Weinheim, Ger.) 10, 259-261, (1998).
		[29] S. Sun et al., MONODISPERSE FePt NANOPARTICLES AND FERROMAGNETIC FePt NANOCRYSTAL SUPERLATTICES, Science 287, 1989-1992, (2000).
		[30] A. F. Puntes et al., COLLOIDAL NANOCRYSTAL SHAPE AND SIZE CONTROL: THE CASE OF COBALT, Science 291, 2115-2117, (2001).

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		[31] T. Hyeon et al., SYNTHESIS OF HIGHLY CRYSTALLINE AND MONODISPERSE MAGHEMITE NANOCRYSTALLITES WITHOUT A SIZE-SELECTION PROCESS, J. Am. Chem. Soc. 123, 12798-12801, (2001).
		[32] D. R. Baselt et al., A HIGH SENSITIVITY MICROMACHINED BIOSENSOR, Proc. IEEE 85, 672-680, (1997).
		[33] M. A. Lantz et al., HIGH RESOLUTION EDDY CURRENT MICROSCOPY, Appl. Phys. Lett. 78, 383-385, (2001).
		[34] T. Ono et al., MAGNETIC FORCE AND OPTICAL FORCE SENSING WITH ULTRATHIN SILICON RESONATOR, Rev. Sci. Instrum. 74, 5141-5146, (2003).
		[46] P. J. McDonald et al., STRAY FIELD MAGNETIC RESONANCE IMAGING, Rep. Prog. Phys. 61, 1441-1493, (1998).
		[47] D. I. Hoult et al., THE QUANTUM ORIGINS OF THE FREE INDUCTION DECAY SIGNAL AND SPIN NOISE, J. Magn. Reson. 148, 182-199, (2001).
		[48] J. A. Sidles et al., THE CLASSICAL AND QUANTUM THEORY OF THERMAL MAGNETIC NOISE, WITH APPLICATIONS IN SPINTRONICS AND QUANTUM MICROSCOPY, Proc. IEEE 91, 799-816, (2003).
		[49] J. D. Hannay et al., THERMAL FIELD FLUCTUATIONS IN A MAGNETIC TIP/IMPLICATIONS FOR MAGNETIC RESONANCE FORCE MICROSCOPY, J. Appl. Phys. 87, 6827-6829, (2000).
		[51] L. R. Narasimhan et al., SQUID MICROSUSCEPTOMETRY IN APPLIED MAGNETIC FIELDS, IEEE Trans. Appl. Supercond. 9, 3503-3506, (1999).
		[52] G. Boero et al.,HALL DETECTION OF MAGNETIC RESONANCE, Appl. Phys. Lett. 79, 1498-1500, (2001).
		[53] R. D. Black *et al.*, A HIGH-TEMPERATURE SUPERCONDUCTING RECEIVER FOR NUCLEAR MAGNETIC RESONANCE MICROSCOPY, Science 259, 793-795, (1993).
		[54] S. Zhang et al., HIGH-SENSITIVTY FERROMAGNETIC RESONANCE MEASUREMENTS ON MICROMETER-SIZED SAMPLES, Appl. Phys. Lett. 70, 2756-2758, (1997).
		[55] F. Bloch, NUCLEAR INDUCTION, Phys. Rev. 70, 460-474, (1946).

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		[57] J. G. Kempf et al., NANOSCALE FOURIER-TRANSFORM IMAGING WITH MAGNETIC RESONANCE FORCE MICROSCOPY, Phys. Rev. Lett. 90, 087601-4 (2003).
		[58] E. E. Sigmund et al., HOLE-BURNING DIFFUSION MEASUREMENTS IN HIGH MAGNETIC FIELD GRADIENTS, J. Magn. Reson. 163, 99-104, (2003).
		[59] G. Binning, H. Rohrer, SURFACE STUDIES BY SCANNING TUNNELING MICROSCOPY, Phys. Rev. Lett. 49, 57-61, (1982).
		[60] G. Binning, et al., ATOMIC FORCE MICROSCOPE, Phys. Rev. Lett. 56, 930- 934, (1986).
		[61] R. Wiesendanger, OBSERVATION OF VACUUM TUNNELING OF SPIN-POLARIZED ELECTRONS WITH THE SCANNING TUNNELING MICROSCOPE, Phys. Rev. Lett. 65, 247-251, (1990).
		[62] Y. Manassen et al., DIRECT OBSERVATION OF THE PRECESSION OF INDIVIDUAL PARAMAGNETIC SPINS ON OXIDIZED SILICON SURFACES, Phys. Rev. Lett. 62, 2531-2535, (1989).
		[63] C. Durkan et al., ELECTRONIC SPIN DETECTION IN MOLECULES USING SCANNING-TUNNELING-MICROSCOPY-ASSISTED ELECTRON-SPIN RESONANCE, Appl. Phys. Lett. 80, 458-460, (2002).
		[66] J. Sanny et al., MICROWAVE ELECTRON SPIN RESONANCE SPECTROMETER WITH OPERATION TO 54 Mk IN A DILUTION REFRIGERATOR, *Rev. Sci. Instrum.* **52**, 539-541, (1981).
		[67] H. Mahdjour et al., HIGH-SENSITIVITY BROADBAND MICROWAVE SPECTROSCOPY WITH SMALL NONRESONANT COILS, *Rev. Sci. Instrum.* **57**, 1100-1106, (1986).
		[68] D. L. Olson et al., HIGH-RESOLUTION MICROCOIL ^{1}H-NMR FOR MASS-LIMITED, NANOLITER-VOLUME SAMPLES, *Science* **270**, 1967-1970, (1995).
		[70] D. A. Seeber et al., TRIAXIAL MAGNETIC FIELD GRADIENT SYSTEM FOR MICROCOIL MAGNETIC RESONANCE IMAGING, *Rev. Sci. Instrum.* **71**, 4263-4272 (2000).

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		[71] L. Ciobanu et al., 3D MR MICROSCOPY WITH RESOLUTION 3.7um BY 3.3 um BY 3.3um, *J. Magn. Reson.* **158**, 178-182, (2002).
		[72] M. Barbic et al., ELECTROMAGNETIC MICROMOTOR FOR MICROFLUIDICS APPLICATIONS, *Appl. Phys. Lett.* **79:9**, 1399-1401, (2001).
		[73] M. Barbic et al., SCANNING PROBE ELECTROMAGNETIC TWEEZERS, *Appl. Phys. Lett.* **79:12**, 1897-1899, (2001).
		[74] M. Barbic, MAGNETIC WIRES IN MEMS AND BIO-MEDICAL APPLICATIONS, *J. Magn. Mag. Mater.* **249**, 357-367, (2002).
		[75] M. Todorovic et al., MINIATURE HIGH-SENSITIVITY QUARTZ TUNING FORK ALTERNATING GRADIENT MAGNETOMETRY, *Appl. Phys. Lett.* **73**, 3539-3597 (1998).
		[76] J. A. Rogers et al., USING MICROCONTACT PRINTING TO FABRICATE MICROCOILS ON CAPILLARIES FOR HIGH RESOLUTION PROTON NUCLEAR MAGNETIC RESONANCE ON NANOLITER VOLUMES, *Appl. Phys. Lett.* **70**, 2464 – 2466, (1997).
		[77] Y. J. Kim et al., SURFACE MICROMACHINED SOLENOID INDUCTORS FOR HIGH FREQUENCY APPLICATIONS, *IEEE Trans. Compon. Pack. Manuf. C* **21**, 26-33, (1998).
		[78] G. Boero et al., FULLY INTEGRATED PROBE FOR PROTON NUCLEAR MAGNETIC RESONANCE MAGNETOMETRY, Rev. Sci. Instrum. 72, 2764-2768, (2001).
		[79] M. M. Midzor et al., IMAGING MECHANISMS OF FORCE DETECTED FMR MICROSCOPY, *J. Appl. Phys.* **87**, 6493-6495, (2000).
		[80] H. J. Mamin et al., SUBATTONEWTON FORCE DETECTION AT MILLIKELVIN TEMPERATURES, *Appl. Phys. Lett.* **79**, 3358-3360, (2001).
		[81] H. J. Mamin et al., SUPERCONDUCTING MICROWAVE RESONATOR FOR MILLIKELVIN MAGNETIC RESONANCE FORCE MICROSCOPY, *Rev. Sci. Instrum.* **74**, 2749-2753, (2003).
		[82] C. Ascoli et al., MICROMECHANICAL DETECTION OF MAGNETIC RESONANCE BY ANGULAR MOMENTUM ABSORPTION, *Appl. Phys. Lett.* **69**, 3920-3922(1996).

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		[83] M. Lohndorf et al., FERROMAGNETIC RESONANCE DETECTION WITH A TORSION-MODE ATOMIC-FORCE MICROSCOPE, *Appl. Phys. Lett.* **76**, 1176-1178, (2000).
		[84] J. Moreland et al., FERROMAGNETIC RESONANCE SPECTROSCOPY WITH A MICROMECHANICAL CALORIMETER SENSOR, *Rev. Sci. Instrum.* **71**, 3099-3103, (2000).
		[85] A. Jander et al., ANGULAR MOMENTUM AND ENERGY TRANSFERRED THROUGH FERROMAGNETIC RESONANCE, *Appl. Phys. Lett.* **78**, 2348-2350, (2001).
		[87] Ya. S. Greenberg, APPLICATION OF SUPERCONDUCTING QUANTUM INTERFERENCE DEVICES TO NUCLEAR MAGNETIC RESONANCE, *Rev. Mod. Phys.* **70**, 175-222, (1998).
		[88] H. Bergh, NONLINEAR COUPLING AND RADIATION DAMPING IN OSCILLATOR-DETECTED MAGNETIC RESONANCE OF SINGLE SPINS, *Meas. Sci. Technol.* **7**, 1019-1026, (1996).
		[89] A. Suter et al., PROBE-SAMPLE COUPLING IN THE MAGNETIC RESONANCE FORCE MICROSCOPE, *J. Magn. Reson.* **154**, 210-227, (2002).

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